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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,731	12/14/2001	Timothy A. Thomas	CR00300M	8817

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EXAMINER
LE, LANA N

ART UNIT	PAPER NUMBER
2684	

DATE MAILED: 03/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,731	THOMAS ET AL.	
	Examiner	Art Unit	
	Lana Le	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4, 6, 8,10,12,16-18,23,24 and 28* is/are rejected.

7)☒ Claim(s) *2,3,5,7,9,11,13,14,15,19-22 and 25-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claims Rejections – 35 USC 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 6, 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The "channel conditions" that includes TOA estimates is not an appropriate claim because TOA estimates measures the signal and is not really considered a channel condition.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 23-28 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for performing the method steps of channel estimation, does not reasonably provide enablement for a computer program, see MPEP §2106. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to the invention commensurate in scope with these claims. The specification does not disclose a detailed program software flow chart or psuedo computer language chart or a program written by an ordinary skilled programmer with reasonable experimentation. Therefore, the claimed

language of a "program readable medium storing a computer program" in claims 23-28 is inappropriate.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 23-28 are directed to non-statutory subject matter. Computer programs claimed as computer listings per se, i.e. "computer readable code", the descriptions or expressions of the programs, are not physical things. They are not neither computer components nor statutory processes. Such claimed computer programs do not define any structural interrelationships between the computer program and other claimed elements of a computer which permit the computer's functionality to be realized.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 4, 10, 12, 16, 17-18, 23-24, 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Labedz et al (US 5,251,233).

Regarding claim 1, Labedz et al discloses a method for adaptive channel estimation comprising:

providing a channel estimate (col 4, lines 53-64);

determining an at least one channel condition (tap modification) (col 5, lines 17-28; col 2, lines 58-61); and

determining an adapted channel estimate (modified C.I.R estimate) as a function of the channel estimate and the channel condition (col 2, lines 14-18; col 5, lines 26-44).

Regarding claim 4, Labedz et al further discloses the method of claim 1 wherein the channel condition is selected from the group comprising multi-path component, direction of arrival, dominant time-taps, time of arrival, and Doppler frequencies (col 5, lines 17-44).

Regarding claim 10, Labedz et al further discloses the method of claim 1 wherein the channel condition includes a time domain channel estimate (col 4, lines 39-49).

Regarding claim 12, Labedz et al further discloses the method of claim 1 further comprising: replacing the channel estimate with the adapted channel estimate (col 2, lines 14-18).

Regarding claim 16, Labedz further discloses the method of claim 1 further comprising:

providing a threshold value (col 5, lines 1-8) ;

determining a dominant tap value as a function of the threshold

value (col 5, lines 5-28); and

determining the adapted channel estimate as a function of the

dominant tap value (col 5, lines 26-28).

Regarding claim 17, Labedz et al discloses a system for adaptive channel estimation comprising:

means for providing a channel estimate (col 4, lines 53-64);;

means for determining an at least one channel condition (tap modification) (col 5, lines 17-28; col 2, lines 58-61); and

means for determining an adapted channel estimate (modified C.I.R estimate) as a function of the channel estimate and the channel condition (col 2, lines 14-18; col 5, lines 26-44).

Regarding claim 18, Labedz et al further discloses the system of claim 17 further comprising means for replacing the channel estimate with the adapted channel estimate (col 2, lines 14-18; col 5, lines 26-44).

Regarding claim 23, Labedz et al discloses a computer readable medium storing a computer program comprising:

computer readable code for providing a channel estimate (col 4, lines 53-64);

computer readable code for determining an at least one channel condition (tap modification) (col 5, lines 17-28; col 2, lines 58-61); and

computer readable code for determining an adapted channel estimate (modified C.I.R estimate) as a function of the channel estimate and the channel condition (col 2, lines 14-18; col 5, lines 26-44).

Regarding claim 24, Labedz et al further discloses the computer readable medium of claim 23 further comprising computer readable code for replacing the

channel estimate with the adapted channel estimate (col 2, lines 14-18; col 5, lines 26-44).

Regarding claim 28, Labedz et al further discloses the computer readable medium of claim 23 further comprising:

computer readable code for providing a threshold value (col 5, lines 1-8);

computer readable code for determining a dominant tap value as a function of the threshold value (col 5, lines 5-28); and

computer readable code for determining the adapted channel estimate as a function of the dominant tap value (col 5, lines 26-28).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 6, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Labedz et al in view of Friedlander et al (US 6,501,747).

Regarding claim 6, Labedz et al further discloses the method of claim 1 wherein Labedz et al didn't further disclose the channel condition includes a time separation value T. Friedlander et al further discloses the channel condition includes a time

separation value T (col 4, lines 5-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the time separation value to measure the delayed signal of Labedz via the beamformer coefficients .

Regarding claim 8, Labedz et al further discloses the method of claim 1 wherein Labedz et al didn't further disclose the channel condition includes a TOA estimate. Friedlander et al further discloses the channel condition includes a TOA estimate (col 4, lines 5-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use TOA to estimate the multipath signal Labedz via the beamformer coefficients.

Allowable Subject Matter

1. Claims 2, 3, 5, 7, 9, 11, 13-15, 19-22, 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 2, the cited prior art fails to further disclose the method of claim 1 wherein the channel estimate is a e-j(01-0f)

function of the equation G(u,m) = X^H (u)Y(m) Y and z (t,f)

Regarding claim 3, the cited prior art fails to further disclose the method of claim 1 wherein the channel estimate is a function of the equation Hn (k) = Y(k)/pl(k).

Regarding claim 5, the cited prior art fails to further disclose the method of claim 1 wherein the adapted channel estimate is a function of the equation:

min Σ,etc.

Regarding claim 7, the cited prior art fails to further disclose the cited prior art fails to further disclose the method of claim 1 wherein the adapted channel estimate is a function of the equation:

pnk=p1(k) e^-j2kπ(n-1)L/K

Regarding claim 9, the cited prior art fails to further disclose the method of claim 1 wherein the adapted channel estimate is a function of the equation:

$\Delta t(l) = \Sigma$ Im {} etc.

Regarding claim 11, the cited prior art fails to further disclose the method of claim 1 wherein the adapted channel estimate is a function of the equation:

$\sigma(h) = \sigma(n)$ Qd

Regarding claim 13, the cited prior art fails to further disclose the method of claim 1 further comprising: initializing at least one iteration variable;

calculating an error update as a function of the iteration variable; and

determining the adapted channel estimate as a function of the error update.

Regarding claim 14, the cited prior art fails to further disclose the method of claim 1 further comprising: estimating a plurality of TOA values;

separating the TOA values as a function of a time separation value; and

determining the adapted channel estimate as a function of the separated TOA values.

Regarding claim 15, the cited prior art fails to further disclose the method of claim 1 further comprising: estimating a plurality of TOA values;

calculating a TOA gradient as a function of the TOA values; and

determining the adapted channel estimate as a function of the

calculated TOA gradient.

Regarding claim 19, the cited prior art fails to further disclose the system of claim 17 further comprising:

means for initializing at least one iteration variable;

means for calculating an error update as a function of the iteration variable; and

means for determining the adapted channel estimate as a

function of the error update.

Regarding claim 20, the cited prior art fails to further disclose the system of claim 17 further comprising:

means for estimating a plurality of TOA values;

means for separating the TOA values as a function of a time

separation value; and

means for determining the adapted channel estimate as a

function of the separated TOA values.

Regarding claim 21, the cited prior art fails to further disclose the system of claim 17 further comprising:

means for estimating a plurality of TOA values; means for calculating a TOA gradient as a function of the TOA values; and

means for determining the adapted channel estimate as a function of the calculated TOA gradient.

Regarding claim 22, the cited prior art fails to further disclose the system of claim 17 further comprising:

means for providing a threshold value; means for determining a dominant tap value as a function of the threshold value; and

means for determining the adapted channel estimate as a function of the dominant tap value.

Regarding claim 25, the cited prior art fails to further disclose the computer readable medium of claim 23 further comprising:

computer readable code for initializing at least one iteration variable;

computer readable code for calculating an error update as a function of the iteration variable; and computer readable code for determining the adapted channel estimate as a function of the error update.

Regarding claim 26, the cited prior art fails to further disclose the computer readable medium of claim 23 further comprising:

computer readable code for estimating a plurality of TOA values;

computer readable code for separating the TOA values as a function of a time separation value; and

computer readable code for determining the adapted channel estimate as a function of the separated TOA values.

Regarding claim 27, the cited prior art fails to further disclose the computer readable medium of claim 23 further comprising:

computer readable code for estimating a plurality of TOA values;

computer readable code for calculating a TOA gradient as a function of the TOA values; and

computer readable code for determining the adapted channel estimate as a function of the calculated TOA gradient.

Specification

The abstract of the disclosure is objected to because of the phrase "The invention provides..." is inappropriate for abstract language. Correction is required. See MPEP § 608.01(b).

Conclusion

8. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for formal communications intended for entry)

or:

(for informal or draft communications, please label "PROPOSED" or "DRAFT"

Hand-delivered responses should be brought to the Crystal Park II, 2021 Crystal Drive, Arlington VA, Sixth Floor (Receptionist).

Any inquiry concerning this communication or communications from the examiner should be directed to Lana Le whose telephone number is (703) 308-5836 and to the supervisory patent examiner Daniel Hunter whose telephone number is (703) 308-6732.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-6750.

L. L.

Lana Le

February 22, 2003

WILLIAM CUMMING
PRIMARY EXAMINER
GROUP 2600